

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Currently Amended): A bar-code reader comprising:

a ~~first arrangement to mount a converting element that receives a~~ first circuit board having a photodiode connected to an amplifier which is connected to an A/D converter which receive light reflected from a bar code and ~~converts~~ convert the light received to an electric digital signal; and

a ~~second arrangement to mount~~ second circuit board having a processing unit that receives the electrical digital signal and converts the electrical digital signal to character data representing the bar code and transmits the character data to a POS terminal ~~reproduces the bar code from the electric signal,~~

wherein ~~the first arrangement is a first circuit board and the second arrangement is a second circuit board in which~~ the first circuit board is separate and distinct from the second circuit board and the first circuit board is positioned in the bar code reader so as to optimize the reception of light reflected from the bar code,

wherein the position of the first circuit board is placed in the bar code reader irrespective of the position of the second circuit board,

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~~wherein the first circuit board is placed at a position that is most suitable for receiving light reflected from the bar code and uses a photodiode installed in the first circuit board to receive that light reflected from the bar code.~~

Claim 2 (Original): The bar-code reader according to claim 1, wherein the processing unit includes a first processor that reproduces a pattern of the bar code from the electric signal; and a second processor that reproduces the bar code based on the pattern.

Claim 3 (Currently Amended): The bar-code reader according to claim 1, wherein the processing unit includes ~~an A/D converter that converts the electric signal into a digital signal;~~
a first processor that extracts edge information from the digital signal;
a second processor that reproduces a pattern of the bar-code from the edge information; and
a third processor that reproduces the bar-code from the pattern.

Claim 4 (Original): The bar-code reader according to claim 2, wherein the first processor performs reproduction of the pattern and the second processor performs reproduction of the bar-code by executing computer programs, and the bar-code reader further comprises a storage unit that stores the computer programs.

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Claim 5 (Original): The bar-code reader according to claim 3, wherein the first processor performs extraction of the edge information, the second processor performs reproduction of the pattern, and the third processor performs reproduction of the bar-code by executing computer programs, and the bar-code reader further comprises a storage unit that stores the computer programs.

Claim 6 (Original): The bar-code reader according to claim 4, wherein one of the first processor and the second processor functions as a managing processor and manages the computer programs in the storage unit.

Claim 7 (Original): The bar-code reader according to claim 4, wherein each one of the first processor and the second processor includes a memory unit, and when executing a computer program that is stored in the storage unit, the managing processor reads a corresponding computer program from the storage unit and writes the computer program read into the memory unit of a processor that is to execute the computer program.

Claim 8 (Original): The bar-code reader according to claim 5, wherein one of the first processor, the second processor, and the third processor functions as a managing processor and manages the computer programs in the storage unit.

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Claim 9 (Original): The bar-code reader according to claim 5, wherein each one of the first processor, the second processor, and the third processor includes a memory unit, and when executing a computer program that is stored in the storage unit, the managing processor reads a corresponding computer program from the storage unit and writes the computer program read into the memory unit of a processor that is to execute the computer program.

Claim 10 (Original): The bar-code reader according to claim 4, further comprising a communicating unit that receives new computer program or an updated version of the computer program stored in the storage unit from an external unit, and writes the new computer program or overwrites the updated version on a corresponding computer program in the storage unit.

Claim 11 (Original): The bar-code reader according to claim 5, further comprising a communicating unit that receives new computer program or an updated version of the computer program stored in the storage unit from an external unit, and writes the new computer program or overwrites the updated version on a corresponding computer program in the storage unit.

Claim 12 (Original): The bar-code reader according to claim 10, wherein the communicating unit transmits the bar code reproduced to the external unit.

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Claim 13 (Original): The bar-code reader according to claim 11, wherein the communicating unit transmits the bar code reproduced to the external unit.

Claim 14 (Original): The bar-code reader according to claim 1, further comprising a third arrangement to mount a converting element that receives a light reflected from the bar code and converts the light received to a third electric signal, wherein the processing unit mounted on the second arrangement also reproduces the bar code from the third electric signal.

Claim 15 (Original): The bar-code reader according to claim 14, wherein the processing unit decides, based on certain conditions, which of the bar codes out of the one that is reproduced from the electric signal and that is reproduced from the third electric signal is accurate.

Claim 16 (Currently Amended): A method of reading a bar code using a bar code reader that includes a photodiode which receives light reflected from a bar code, a first processor that reproduces a pattern of the bar code from a electric signal, the first processor having a first memory unit; a second processor that reproduces the bar code based on the pattern, the second processor having a second memory unit; and a storage unit that stores a first computer program and a second computer program, comprising:

the first processor reading the first computer program from the storage unit, storing the first computer program into the first memory unit, and executing the first computer program to reproduce

the pattern; and

the first processor reading the second computer program from the storage unit and storing the second computer program into the second memory unit of the second processor, and the second processor executing the second computer program to reproduce the bar code,

wherein the photodiode connected to an amplifier which is connected to an A/D converter are ~~are~~ located on a first circuit board ~~and~~ containing the first processor, the second processor and storage unit are located on a second circuit board in which the first circuit board is separate and distinct from the second circuit board and the first circuit board is positioned in the bar code reader so as to optimize the reception of light reflected from the bar code,

wherein the position of the first circuit board is placed in the bar code reader irrespective of the position of the second circuit board.

Claim 17 (Original): The method according to claim 16, further comprising: the first processor receiving an updated version of the first computer program or the second computer program or both from outside; and the first processor overwriting the updated version on a corresponding computer program in the storage unit.

Claim 18 (Original): The method according to claim 17, further comprising transmitting the bar code reproduced to the outside.